

Patent claims

1. An add-drop multiplexing device for an optical wavelength division multiplex transmission system, characterized in that in each of the add-drop multiplexing devices there is provided a group filter (1), which divides an incoming WDM signal (WMS1) into a plurality of channel groups (G1-G4) with channels (K1-K32) of different wavelengths, in that there is provided a plurality of modules (M1-M4) for connecting through and branching off channels, in that there is provided a plurality of module types (MM, MD, MF), which can be used as and when required, in that there is provided a first module type (MM), which makes possible a manual reconfiguration of connected-through and add-drop channels (K1 - K8) and configures long-term connections of the channels (K9-K16) of a channel group (G1, G2, G3; G2..), and/or there is provided a third module type (MD), which in each case connects through a channel group (G1, G3) as a closed unit, in that there is provided a second module type (MF), which makes possible a remote configuration of connected-through channels and add-drop channels (K25 - K32), and short-term connections in each case of channels (K25-K32) of a further channel group (G4) with a plurality of different wavelength are realized, and in that there is provided a combination filter (17), to which the possibly reconfigured channel groups (N1-N4), which are combined to form an outgoing WDM signal (WMS2), are fed.
2. The add-drop multiplexing device as claimed in claim 1, characterized in that there is provided a fourth module type (MF25, MF26, MF27), which makes possible a remote configuration of drop-continue channels.

3. The add-drop multiplexing device as claimed in claim 1, characterized

in that the first module type (MM) contains essentially a WDM demultiplexer (2) a manually configurable switching unit (6) and a WDM multiplexer (13).

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4. The add-drop multiplexing device as claimed in claim 1 or 3, characterized in that the second module type (MF) contains a WDM demultiplexer (5) a remote-configurable switching unit (9) and a WDM multiplexer (16).
- 10 5. The add-drop multiplexing device as claimed in claim 1 or 3, characterized in that the second module type (MF) contains an add-drop-continue device with at least one circulator (18) and a tunable filter (19) and also a coupling-in device (20).
- 15 6. The add-drop multiplexing device as claimed in claim 1, characterized in that an optical connecting cable (23) is provided as the third module type (MD).
- 20 7. The add-drop multiplexing device as claimed in claim 2, characterized in that the fourth module type (MF25, MF26, MF27) has a coupling device (22) for coupling out at least part of the incoming WDM signal and a circulator (30) and also at least one tunable filter (32, 33).
- 25 8. The add-drop multiplexing device as claimed in claim 5 or 7, characterized in that the transmission loss of the filter (19, 32, 33) is adjustable.
- 30 9. The add-drop multiplexing device as claimed in claim 8, characterized
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in that the transmission loss of the filter (19, 32, 33) is thermally adjustable.

- 5 10. The add-drop multiplexing device as claimed in claim 5 or 7, characterized in that, provided as tunable filters (19, 32, 33) are narrow-band, series-connected Bragg channel filters which can be tuned with regard to the resonant wavelength and the stop band of which is so narrow that a filter
10 (19, 32, 33) tuned to a wavelength lying between the channels (K25 - K32) does not influence the function of the adjacent channels (K25 - K32), at least not significantly.
- 15 11. The add-drop multiplexing device as claimed in claim 10, characterized in that the series connection of the tunable filters (19, 32, 33) is terminated by an optical absorber (35), into which non-reflected WDM signals are directed.
- 20 12. The add-drop multiplexing device as claimed in claim 9, characterized in that, for the coupling-out of a plurality of channels (K25 - K32), a WDM demultiplexer (34) is additionally provided, the
25 latter being designed at least for precisely the number of channels (K25 - K32) as corresponds to the number of tunable filters (19, 32, 33).
- 30 13. The add-drop multiplexing device as claimed in claim 2, characterized in that the fourth module type has a coupling device (22), for coupling out at least part of the incoming WDM signal, and at least one filter arrangement acting as a WDM
35 demultiplexer (34), for separating the coupled-out WDM signal into a plurality of channels (K25 - K32) of different wavelength.

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14. The add-drop multiplexing device as claimed in one of the preceding claims, characterized in that the channels (K1 - K8) of a channel group (G1) are adjacent in terms of frequency.

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15. A wavelength division multiplex transmission system with a plurality of add-drop multiplexing devices (NK1 - NK4) as claimed in one of the preceding claims connected to one another via optical waveguides (28, 29).

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